

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A beam homogenizer comprising:
a cylindrical lens for converging a laser light in a width direction; and
a light guide for homogenizing an energy distribution of [[a]] the laser light along
[[a]] the width direction of a line-shape on an irradiated surface,
wherein a beam spot of the laser light is shaped into the line-shape on the
irradiated surface, and
wherein the light guide comprises two reflective surfaces facing to each other.
2. (Canceled)
3. (Currently Amended) A beam homogenizer comprising:
a cylindrical lens for converging a laser light in a width direction; and
a light pipe for homogenizing an energy distribution of [[a]] the laser light along
[[a]] the width direction of a line-shape on an irradiated surface,
wherein a beam spot of the laser light is shaped into the line-shape on the
irradiated surface, and
wherein the light pipe comprises two reflective surfaces facing to each other.
4. (Canceled)
5. (Currently Amended) A beam homogenizer comprising:
a first cylindrical lens for converging a laser light in a width direction;

a light guide for homogenizing an energy distribution of [[a]] the laser light along [[a]] the width direction of a line-shape on an irradiated surface; and

at least one second cylindrical lens for condensing the laser light output from [[said]] the light guide along [[a]] the width direction of the line-shape on the irradiated surface,

wherein a beam spot of the laser light is shaped into the line-shape on the irradiated surface, and

wherein the light guide comprises two reflective surfaces facing to each other.

6. (Canceled)

7. (Currently Amended) A beam homogenizer comprising:

a first cylindrical lens for converging a laser light in a width direction;

a light pipe for homogenizing an energy distribution of [[a]] the laser light along [[a]] the width direction of a line-shape on an irradiated surface; and

at least one second cylindrical lens for condensing the laser light output from [[said]] the light pipe along [[a]] the width direction of the line-shape on the irradiated surface,

wherein a beam spot of the laser light is shaped into the line-shape on the irradiated surface, and

wherein the light pipe comprises two reflective surfaces facing to each other.

8. (Canceled)

9. (Currently Amended) A beam homogenizer comprising:

a unit for homogenizing an energy distribution of a laser light along a length direction of a line-shape on an irradiated surface; [[and]]

a cylindrical lens for converging the laser light in a width direction; and

a light guide for homogenizing the energy distribution along [[a]] the width direction of the line-shape on the irradiated surface,

wherein [[said]] the unit has at least a cylindrical lens array, [[and]]

wherein a beam spot of the laser light is shaped into the line-shape on the irradiated surface, and

wherein the light guide comprises two reflective surfaces facing to each other.

10. (Canceled)

11. (Currently Amended) A beam homogenizer comprising:

a unit for homogenizing an energy distribution of a laser light along a length direction of a line-shape on an irradiated surface; [[and]]

a cylindrical lens for converging the laser light in a width direction; and

a light pipe for homogenizing the energy distribution along [[a]] the width direction of the line-shape on the irradiated surface,

wherein [[said]] the unit has at least a cylindrical lens array, [[and]]

wherein a beam spot of the laser light is shaped into the line-shape on the irradiated surface, and

wherein the light pipe comprises two reflective surfaces facing to each other.

12. (Canceled)

13. (Currently Amended) A laser irradiation apparatus comprising:

a laser oscillator; and

a beam homogenizer,

wherein [[said]] the beam homogenizer [[has]] comprises a cylindrical lens for converging a laser light in a width direction and a light guide for homogenizing an

energy distribution of [[a]] the laser light along [[a]] the width direction of a line-shape, [[and]]

wherein a beam spot of the laser light is shaped into the line-shape on an irradiated surface, and

wherein the light guide comprises two reflective surfaces facing to each other.

14. (Currently Amended) The laser irradiation apparatus according to claim 13, wherein [[said]] the laser oscillator is a YAG laser, or a glass laser.

15. (Currently Amended) The laser irradiation apparatus according to claim 13, wherein [[said]] the laser oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

16. (Currently Amended) A laser irradiation apparatus comprising:

a laser oscillator; and

a beam homogenizer,

wherein [[said]] the beam homogenizer [[has]] comprises a first cylindrical lens for converging a laser light in a width direction, a light guide for homogenizing an energy distribution of [[a]] the laser light along [[a]] the width direction of a line-shape, and at least one second cylindrical lens for condensing the laser light output from the light guide along the width direction of the line-shape,

wherein [[said]] the light guide comprises two reflective surfaces facing to each other, and

wherein a beam spot of the laser light is shaped into the line-shape on an irradiated surface.

17. (Currently Amended) The laser irradiation apparatus according to claim 16, wherein [[said]] the laser oscillator is a YAG laser, or a glass laser.

18. (Currently Amended) The laser irradiation apparatus according to claim 16, wherein [[said]] the laser oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

19. (Currently Amended) A laser irradiation apparatus comprising:

a laser oscillator; and

a beam homogenizer,

wherein [[said]] the beam homogenizer [[has]] comprises a cylindrical lens for converging a laser light in a width direction and a light pipe for homogenizing an energy distribution of [[a]] the laser light along [[a]] the width direction of a line-shape, [[and]]

wherein a beam spot of the laser light is shaped into the line-shape on an irradiated surface, and

wherein the light pipe comprises two reflective surfaces facing to each other.

20. (Currently Amended) The laser irradiation apparatus according to claim 19, wherein [[said]] the laser oscillator is a YAG laser, or a glass laser.

21. (Currently Amended) The laser irradiation apparatus according to claim 19, wherein [[said]] the laser oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

22. (Currently Amended) A laser irradiation apparatus comprising:

a laser oscillator; and

a beam homogenizer,

wherein [[said]] the beam homogenizer [[has]] comprises a first cylindrical lens for converging a laser light in a width direction, a light pipe for homogenizing an energy distribution of [[a]] the laser light along [[a]] the width direction of a line-shape, and at least one second cylindrical lens for condensing the laser light output from the light pipe along the width direction of the line-shape,

wherein [[said]] the light pipe comprises two reflective surfaces facing to each other, and

wherein a beam spot of the laser light is shaped into the line-shape on an irradiated surface.

23. (Currently Amended) The laser irradiation apparatus according to claim 22, wherein [[said]] the laser oscillator is a YAG laser, or a glass laser.

24. (Currently Amended) The laser irradiation apparatus according to claim 22, wherein [[said]] the laser oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

25. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

forming a non-single-crystal semiconductor film on a substrate;

generating a laser beam with a laser beam oscillator;

using at least a cylindrical lens array, a cylindrical lens and a light guide to shape the laser beam so as to form a linear beam spot of a laser light on an irradiated surface with its energy distribution along a width direction homogenized;

setting the substrate with the non-single-crystal semiconductor film formed thereon on a stage to make a surface of the non-single-crystal semiconductor film coincide with the irradiated surface; and

performing a laser annealing of the non-single-crystal semiconductor film by irradiating the semiconductor film surface with the linear laser [[beam]] light while causing [[said]] the stage to scan relative to the laser [[beam]] light,

wherein [[said]] the cylindrical lens array acts on the linear beam spot along a length direction of the spot,

[[said]] wherein the light guide [[acts]] and the cylindrical lens act on the linear beam spot along [[a]] the width direction of the spot, and

wherein the light guide comprises two reflective surfaces facing to each other.

26. (Currently Amended) The method of manufacturing a semiconductor device according to claim 25, wherein [[said]] the laser beam oscillator is a YAG laser, or a glass laser.

27. (Currently Amended) The method of manufacturing a semiconductor device according to claim 25, wherein [[said]] the laser beam oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

28. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

forming a non-single-crystal semiconductor film on a substrate;

generating a laser beam with a laser beam oscillator;

using at least a cylindrical lens array and array, a first cylindrical lens, a light guide and a second cylindrical lens to shape the laser beam so as to form a linear beam spot of a laser light on an irradiated surface with its energy distribution along a width direction homogenized;

setting the substrate with the non-single-crystal semiconductor film formed thereon on a stage to make a surface of the non-single-crystal semiconductor film coincide with the irradiated surface; and

performing a laser annealing of the non-single-crystal semiconductor film by irradiating the semiconductor film surface with the linear laser [[beam]] light while causing [[said]] the stage to scan relative to the laser [[beam]] light,

wherein [[said]] the cylindrical lens array acts on the linear beam spot along a length direction of the spot,

[[said]] wherein the light guide acts guide, the first cylindrical lens and the second cylindrical lens act on the linear beam spot along [[a]] the width direction of the spot, and

[[said]] wherein the light guide comprises two reflective surfaces facing to each other.

29. (Currently Amended) The method of manufacturing a semiconductor device according to claim 28, wherein [[said]] the laser beam oscillator is a YAG laser, or a glass laser.

30. (Currently Amended) The method of manufacturing a semiconductor device according to claim 28, wherein [[said]] the laser beam oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

31. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

forming a non-single-crystal semiconductor film on a substrate;

generating a laser beam with a laser beam oscillator;

using at least a cylindrical lens array, a cylindrical lens and a light pipe to shape the laser beam so as to form a linear beam spot of a laser light on an irradiated surface with its energy distribution along a width direction homogenized;

setting the substrate with the non-single-crystal semiconductor film formed thereon on a stage to make a surface of the non-single-crystal semiconductor film coincide with the irradiated surface; and

performing a laser annealing of the non-single-crystal semiconductor film by irradiating the semiconductor film surface with the linear laser [[beam]] light while causing [[said]] the stage to scan relative to the laser [[beam]] light,

wherein [[said]] the cylindrical lens array acts on the linear beam spot along a length direction of the spot, [[and]]

[[said]] wherein the light pipe [[acts]] and the cylindrical lens act on the linear beam spot along [[a]] the width direction of the spot, and

wherein the light pipe comprises two reflective surfaces facing to each other.

32. (Currently Amended) The method of manufacturing a semiconductor device according to claim 31, wherein [[said]] the laser beam oscillator is a YAG laser, or a glass laser.

33. (Currently Amended) The method of manufacturing a semiconductor device according to claim 31, wherein [[said]] the laser beam oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

34. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

forming a non-single-crystal semiconductor film on a substrate;

generating a laser beam with a laser beam oscillator;

using at least a cylindrical lens array and array, a first cylindrical lens, a light pipe and a second cylindrical lens to shape the laser beam so as to form a linear beam spot of a laser light on an irradiated surface with its energy distribution along a width direction homogenized;

setting the substrate with the non-single-crystal semiconductor film formed thereon on a stage to make a surface of the non-single-crystal semiconductor film coincide with the irradiated surface; and

performing a laser annealing of the non-single-crystal semiconductor film by irradiating the semiconductor film surface with the linear laser [[beam]] light while causing [[said]] the stage to scan relative to the laser [[beam]] light,

wherein [[said]] the cylindrical lens array acts on the linear beam spot along a length direction of the spot,

[[said]] wherein the light pipe acts pipe, the first cylindrical lens and the second cylindrical lens act on the linear beam spot along [[a]] the width direction of the spot, and

[[said]] wherein the light pipe comprises two reflective surfaces facing to each other.

35. (Currently Amended) The method of manufacturing a semiconductor device according to claim 34, wherein [[said]] the laser beam oscillator is a YAG laser, or a glass laser.

36. (Currently Amended) The method of manufacturing a semiconductor device according to claim 34, wherein [[said]] the laser beam oscillator is a YVO₄ laser, a YLF laser, or an Ar laser.

37. (Currently Amended) A method of manufacturing a semiconductor device comprising:

providing a laser light;

passing the laser light through a cylindrical lens for converging the laser light in a width direction;

passing [[said]] the laser light through a light guide; and

irradiating a semiconductor film with [[said]] the laser light after passing through [[said]] the light guide to crystallize [[said]] the semiconductor film,

wherein an energy distribution along the width direction of the laser light at a surface of [[said]] the semiconductor film is homogenized by [[said]] the light guide, and wherein the light guide comprises two reflective surfaces facing to each other.

38. (Canceled)

39. (Currently Amended) A method of manufacturing a semiconductor device comprising:

providing a laser light;

passing the laser light through a cylindrical lens for converging the laser light in a width direction;

passing [[said]] the laser light through a light pipe; and

irradiating a semiconductor film with [[said]] the laser light after passing through [[said]] the light pipe to crystallize [[said]] the semiconductor film,

wherein an energy distribution along the width direction of the laser light at a surface of [[said]] the semiconductor film is homogenized by [[said]] the light pipe, and
wherein the light pipe comprises two reflective surfaces facing to each other.

40. (Canceled)

41. (Currently Amended) A method of manufacturing a semiconductor device comprising:

providing a laser light having a cross section perpendicular to a propagation direction of [[said]] the laser light wherein [[said]] the cross section has a length and a width;

increasing only the length of the cross section of the laser light;

passing the laser light through a cylindrical lens for converging the laser light in a width direction;

passing [[said]] the laser light through a light guide; and

irradiating a semiconductor film with [[said]] the laser light after passing through [[said]] the light guide to crystallize [[said]] the semiconductor film,

wherein an energy distribution of the laser light along a width direction of [[said]]
the cross section is homogenized by [[said]] the light guide, and
wherein the light guide comprises two reflective surfaces facing to each other.

42. (Original) A method according to claim 41, wherein the length of the cross section of the laser light is increased by using a cylindrical lens array having a plurality of cylindrical lenses.

43. (Canceled)

44. (Currently Amended) A method of manufacturing a semiconductor device comprising:

providing a laser light having a cross section perpendicular to a propagation direction of [[said]] the laser light wherein [[said]] the cross section has a length and a width;

increasing only the length of the cross section of the laser light;

passing the laser light through a cylindrical lens for converging the laser light in a width direction;

passing [[said]] the laser light through a light pipe; and

irradiating a semiconductor film with [[said]] the laser light after passing through [[said]] the light pipe to crystallize [[said]] the semiconductor film,

wherein an energy distribution of the laser light along a width direction of [[said]]
the cross section is homogenized by [[said]] the light pipe, and

wherein the light pipe comprises two reflective surfaces facing to each other.

45. (Original) A method according to claim 44, wherein the length of the cross section of the laser light is increased by using a cylindrical lens array having a plurality of cylindrical lenses.

46. (Canceled)

47. (Currently Amended) The laser irradiation apparatus according to claim 13, wherein [[said]] the laser oscillator is an excimer laser.

48. (Currently Amended) The laser irradiation apparatus according to claim 16, wherein [[said]] the laser oscillator is an excimer laser.

49. (Currently Amended) The laser irradiation apparatus according to claim 19, wherein [[said]] the laser oscillator is an excimer laser.

50. (Currently Amended) The laser irradiation apparatus according to claim 22, wherein [[said]] the laser oscillator is an excimer laser.

51. (Currently Amended) The method of manufacturing a semiconductor device according to claim 25, wherein [[said]] the laser beam oscillator is an excimer laser.

52. (Currently Amended) The method of manufacturing a semiconductor device according to claim 28, wherein [[said]] the laser beam oscillator is an excimer laser.

53. (Currently Amended) The method of manufacturing a semiconductor device according to claim 31, wherein [[said]] the laser beam oscillator is an excimer laser.

54. (Currently Amended) The method of manufacturing a semiconductor device according to claim 34, wherein [[said]] the laser beam oscillator is an excimer laser.